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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/804,033	03/13/2001	Yasunobu Hashimoto	1466.1030	8838

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EXAMINER
DHARIA, PRABODH M

ART UNIT	PAPER NUMBER
2673	

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/804,033	HASHIMOTO, YASUNOBU	
	Examiner	Art Unit	
	Prabodh M Dharia	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. **Status:** Receipt is acknowledged of papers submitted on 04-16-2003 under reconsideration and new claim have been placed of record in the file. Claims 1-17 are pending in this action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikoshiba et al. (5,907,316) in view of Matsushiro (6,459,817 B1).

Regarding Claim 1, Mikoshiba et al. teaches a data conversion method for displaying an image (Col. 3, Lines 6-14), comprising conversion of original frame data indicating gradation of a pixel into display frame data (Col. 4, Lines 16-24) defining a light emission timing of a display element in a display frame period (Col. 1, Lines 55-64) and the conversion (Col. 14, Lines 3-7, Col. 10, Lines 18-20), method comprising: determining a light emission waveform in accordance with display frame data of plural frames containing a current frame and a previous frame (Col. 14, Lines 15-28), of an error between the determined light emission waveform and a target light emission waveform defined by the original frame data corresponding to the determined light emission waveform; and setting the display frame data of the current frame (Col. 5, Lines 57-67, Col. 14, Line 3 to Col. 15, Line 11).

However, Mikoshiba et al. fails to teach performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized

However, Matsushiro teaches performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized (Col. 3, Lines 57-67, Col. 4, Lines 31-41).

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Matsushiro in teaching of Mikoshiba et al. for reducing unstable and flickering in a high contrast image display medium.

Regarding Claim 2, Matsushiro teaches the weight of each Fourier component is set individually for each light emission color of a display element (Col. 1, Lines 64,65, Col. 11, Lines 34-65).

Regarding Claim 3, Mikoshiba et al. teaches a frequency above a flicker frequency (Col. 8, Lines 52-54, Col. 9, Lines 7-13).

Matsushiro teaches the weight of each Fourier component, of a frequency above a flicker frequency, is set to "0" (Col. 3, Line 57 to Col. 4, Line 41).

Regarding Claim 4, Mikoshiba et al. teaches a display device expressing gradation of original frame data (Col. 10, Lines 50-52) by controlling a light emission timing of a display

element in accordance with display frame data (Col. 14, Lines 15-28), the device comprising: an original frame memory memorizing original frame data of at least one frame (Col. 14, Lines 15-17); a display frame memory memorizing display frame data of at least one frame (Col. 8, Lines 33-36); a data converting circuit outputting data corresponding to an input data value as display frame data of the $n+1_{th}$ frame, responding to an input of original frame data of the $n+1_{th}$ frame, original frame data of at least an n_{th} frame from the original frame memory and display frame data of at least an n_{th} frame from the display frame memory, wherein the display frame data outputted by the data converting circuit (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23); indicating a gradation transition defined by display frame data of plural frames containing a current frame and a previous frame and a target gradation waveform defined by original frame data corresponding to the gradation waveform (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23).

However, Mikoshiba et al. fails to teach performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized

However, Matsushiro teaches performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized (Col. 3, Lines 57-67, Col. 4, Lines 31-41).

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Matsushiro in Mikoshiba et al. teaching for reducing unstable and flickering in a high contrast image display medium.

Regarding Claim 5, Matsushiro teaches the Fourier expansion is performed for each time range having a unit of the display frame period (Col. 3, Line 57 to Col. 4, Lines 41).

Regarding Claim 6, Matsushiro teaches the Fourier expansion is performed for each time range having a unit of the original frame period (Col. 3, Line 57 to Col. 4, Line 41).

Regarding Claim 7, Mikoshiba et al. teaches the target light emission waveform is an interpolation waveform obtained by linear approximation of a transition of discrete target light emission values in each original frame (Col. 2, Line 60, Col. 3, Line 15, Col. 12, Lines 38-46, Col. 14, Lines 3-28, Col. 26, Line 59 to Col. 27, Line 23).

Regarding Claim 8, Mikoshiba et al. teaches a display device expressing gradation of original frame data (Col. 10, Lines 50-52) by controlling a light emission timing of a display element in accordance with display frame data (Col. 14, Lines 15-28), the device comprising: an original frame memory memorizing original frame data of at least one frame (Col. 14, Lines 15-17); a display frame memory memorizing display frame data of at least one frame (Col. 8, Lines 33-36); a data converting circuit outputting data corresponding to an input data value as display frame data of the $n+1_{th}$ frame, responding to an input of original frame data of the $n+1_{th}$ frame,

original frame data of at least an n_{th} frame from the original frame memory and display frame data of at least an n_{th} frame from the display frame memory, wherein the display frame data outputted by the data converting circuit (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23); indicating a gradation transition defined by display frame data of plural frames containing a current frame and a previous frame and a target gradation waveform defined by original frame data corresponding to the gradation waveform (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23).

However, Mikoshiba et al. fails to teach performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized

However, Matsushiro teaches performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized (Col. 3, Lines 57-67, Col. 4, Lines 31-41).

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Matsushiro in Mikoshiba et al. teaching for reducing unstable and flickering in a high contrast image display medium.

Regarding Claim 9, Matsushiro teaches the weight of each Fourier component is set individually for each light emission color of a display element (Col. 1, lines 64,65, Col. 11, Lines 34-65).

Regarding Claim 10, Mikoshiba et al. teaches a frequency above a flicker frequency (Col. 8, Lines 52-54, Col. 9, Lines 7-13).

Matsushiro teaches the weight of each Fourier component, of a frequency above a flicker frequency, is set to "0" (Col. 3, Line 57 to Col. 4, Line 41).

Regarding Claim 11, Mikoshiba et al. teaches the display frame period is different from the original frame period (Col. 16, Line 64 to Col. 17, Line 5, Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23).

Regarding Claim 12, Matsushiro teaches the Fourier expansion is performed for each time range having a unit of the display frame period (Col. 3, Line 57 to Col. 4, Lines 41).

Regarding Claim 13, Matsushiro teaches the Fourier expansion is performed for each time range having a unit of the original frame period (Col. 3, Line 57 to Col. 4, Lines 41).

Regarding Claim 14, Mikoshiba et al. teaches the target gradation waveform is an interpolation waveform obtained by linear approximation of a transition of discrete target gradation values in each original frame (Col. 2, Line 60, Col. 3, Line 15, Col. 12, Lines 38-46, Col. 14, Lines 21-28, Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23).

Regarding Claim 15, Mikoshiba et al. teaches a display device expressing gradation of original frame data (Col. 10, Lines 50-52) by controlling a light emission timing of a display

element in accordance with display frame data (Col. 14, Lines 15-28), the device comprising: an original frame memory memorizing original frame data of at least one frame (Col. 14, Lines 15-17); a display frame memory memorizing display frame data of at least one frame (Col. 8, Lines 33-36); a data converting circuit outputting data corresponding to an input data value as display frame data of the $n+1_{th}$ frame, responding to an input of original frame data of the $n+1_{th}$ frame, original frame data of at least an n_{th} frame from the original frame memory and display frame data of at least an n_{th} frame from the display frame memory, wherein the display frame data outputted by the data converting circuit (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23); indicating a gradation transition defined by display frame data of plural frames containing a current frame and a previous frame and a target gradation waveform defined by original frame data corresponding to the gradation waveform (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23).

However, Mikoshiba et al. fails to teach performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized

However, Matsushiro teaches performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized (Col. 3, Lines 57-67, Col. 4, Lines 31-41).

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Matsushiro in Mikoshiba et al. teaching for reducing unstable and flickering in a high contrast image display medium.

Regarding Claim 16, Mikoshiba et al. teaches a display device expressing gradation of original frame data (Col. 10, Lines 50-52) by controlling a light emission timing of a display element in accordance with display frame data (Col. 14, Lines 15-28), the device comprising: an original frame memory memorizing original frame data of at least one frame (Col. 14, Lines 15-17); a display frame memory memorizing display frame data of at least one frame (Col. 8, Lines 33-36); a data converting circuit outputting data corresponding to an input data value as display frame data of the $n+1_{th}$ frame, responding to an input of original frame data of the $n+1_{th}$ frame, original frame data of at least an n_{th} frame from the original frame memory and display frame data of at least an n_{th} frame from the display frame memory, wherein the display frame data outputted by the data converting circuit (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23); indicating a gradation transition defined by display frame data of plural frames containing a current frame and a previous frame and a target gradation waveform defined by original frame data corresponding to the gradation waveform (Col. 14, Lines 3-10, Col. 26, Line 59 to Col. 27, Line 23).

However, Mikoshiba et al. fails to teach performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized

However, Matsushiro teaches performing Fourier expansion of the pixel gradation with respect to weights that are obtained by weighting each Fourier component, so that summing the result (error components) helps the changing of the overall darkness of the image is minimized (Col. 3, Lines 57-67, Col. 4, Lines 31-41).

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Matsushiro in Mikoshiba et al. teaching for reducing unstable and flickering in a high contrast image display medium.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okajima et al. (JP 11-224074) in view of Tanaka (6,552,701 B1).

Regarding Claim 17, Okajima et al. teaches a data conversion method to display an image (page 1, Abstract, Lines 1-6), comprising: determining a light emission waveform in accordance with display frame data of plural frames containing a current frame and a previous frame (page 1, paragraph solution, Lines 1-4); and performing Fourier expansion of an error between the determined light emission wave form and a target light emission waveform defined by the original frame data corresponding to the determined light emission waveform (page 14, paragraph, 57).

However, Okajima fails to teach specifically Fourier Expansion.

However, Tanaka teaches specifically Fourier Expansion for periodic function. (Col. 9, Lines 31-38).

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Tanaka in Okajima teaching for reducing unstable and flickering in a high contrast image display medium.

Response to Arguments

5. Applicant's arguments filed 04-16-2003 have been fully considered but they are not persuasive.

6. Applicant argues cited refrences do not teach Fourier expansion.

Examiner disagrees as, Matsushiro reference does teach Fourirer-series expansions (Col. 3, Line 62). However, Fourier-series is a pre-established mathematical expression. Also by integrating the Fourier expansion, the validity of expansion is established by making sure the series do converge, otherwise it is an erroneous expansion. Also, since method of solving a mathematical equation cannot be patented, it follows that the addition of old and necessary antecedent steps of establishing values for the variables in the equation cannot convert the unpatentable method to patentable subject matter. (In re Christensen, 178 USPQ 35 (CCPA 1973).

Applicant argues as cited refrences do not teach performing Fourier expansion of an error between the determined light emission wave form and a target light emission waveform defined by the original frame data corresponding to the determined light emission waveform.

Examiner response is applicant's arguments are moot because of new ground of rejection.

Applicant argues cited refrences do not teach the sum of the periodic functions is the minimumvalue.

Examiner disagrees, as Mikoshiba et al. teaches a frequency above a flicker frequency (Col. 8, Lines 52-54, Col. 9, Lines 7-13). Matsushiro teaches the weight of each Fourier component, of a frequency above a flicker frequency, is set to "0" (Col. 3, Line 57 to Col. 4, Line 41) and Matsushiro teaches to avoid overall darkness (positive) of the image or noticeably lightened (negetive) image, the sum is balanced to minimum to maintained flicker free image.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is informed that all of the other additional cited references render the claims obvious.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Okumura et al. (5,739,804) Display Device.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prabodh Dharia whose telephone number is (703) 605-1231. The examiner can normally be reached Monday- Friday from 8:00 AM to 5:00 PM.

If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala, can be reached at (703) 305-4938. The fax number of the group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4750.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

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05-28-2003

Amare Mengistu
Primary Examiner